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SOME INTERESTING EGG MONSTROSITIES.

CHARLES W. HARGITT.

UNDER the caption "Ein Ei im Ei" there appeared in the *Zoologischer Anzeiger* of Aug. 17, 1896, an interesting account by Vom Seigm. Schumacher of a small egg of the fowl enclosed within a larger. This report has recalled my attention to observations made by myself some years ago and reported to the Indiana Academy of Science, but which were never published except by title. Similar cases of somewhat similar character which have since come to my knowledge, and their somewhat unusual and abnormal phenomena, lead me to submit the following statement of facts which in their way may not be without a measure of interest.

The first case which came under my observation was an egg of very large dimensions, almost three inches long by about two inches in short diameter, brought into my laboratory by a student. It was a double egg in a rather unusual sense. The

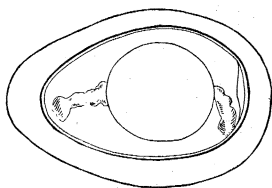


FIG. 1.

outer one was of the dimensions indicated, while the inner was of about normal size and form, and of perfectly normal structure. That is, it was composed of yolk, albumen, chalaza, shell-membrane, and shell. The outer was similar, except that it was wholly devoid of yolk. There was the usual proportion of albumen of the usual consistency, a shell-membrane, and a perfectly formed shell of the usual density. Fig. 1 presents a sectional view of the egg.

Considerable inquiry failed for some time to elicit any information of similar cases. Later a report was made by Mr. Charles Dury, of the Cincinnati Society of Natural History, of a somewhat similar case of a monstrous egg laid by an ostrich in the Cincinnati Zoölogical Garden. Of the exact size of this egg no data were given. Its similarity consisted chiefly in the fact that the center of the monstrosity was a normal egg. About this, as a sort of nucleus, there had been formed some twenty concentric layers of what the report simply indicated as a sort of tough, leathery-like substance, but which, I infer, was probably a toughened albuminous mass. Whether the whole was enclosed within a second shell the report did not designate.

Another case was brought to my attention by Prof. O. P. Jenkins, at that time of DePauw University, later of Stanford University. It was apparently of the same general character as the first one referred to. The same observer also gave me the record of a similar egg laid by a turkey-hen. In this case the egg was, as in the former, larger than the normal, and contained an inner one of somewhat smaller than normal dimensions. They were similar in all essentials, though with this difference: that while the outer shell was colored the usual way of turkey eggs the inner shell was pure white, thus giving rise to the remark of the one first reporting it, "that it was a turkey's egg with a hen's egg inside of it."

Among several other cases of a similar character which have come within my observation one has some features of peculiar interest. It was reported to me by Prof. Charles H. Gilbert, of Stanford University, who, though he did not personally see the egg, vouched for the substantial accuracy of the facts. The egg was taken from the nest almost immediately after its deposit, and was of the unusual size of those already designated. Like those, it was of the same double character throughout. But the matter of special interest was in the fact that within the inner was an embryo chick of considerable development. A letter from Professor Gilbert on the subject contains this account: "From the manner in which the details were given to me, I have no doubt that it was a *bona fide* case, and that

the embryo was developed at least as far in this perfectly fresh egg as would under ordinary circumstances occur on the fourth day of incubation."

One of the most recent cases of egg monstrosity came into my hands within a few months, and is in some respects wholly unlike any of the others. It consisted of two eggs, as shown in Fig. 2, partly independent, but united by a narrow connective (*c*), in the figure. They differed in size about as indicated, and presented the smaller ends toward each other — a fact in itself somewhat abnormal, as will be shown later. These eggs were devoid of hardened shells, but the larger had considerable deposition of calcareous matter over the entire membrane.

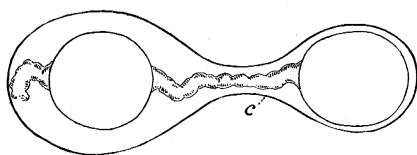


FIG. 2.

This was almost wholly lacking in the smaller. Upon opening the eggs, both were found to contain normal yolks of normal size, and each with distinct germinal areas. The interior of the yolks was of characteristic and normal composition. The different sizes of the eggs were due to the fact that while the larger had its usual amount of albuminous deposit, the smaller was almost wholly devoid of this. But while differing in the amounts of albumen it was in each of the same character, including the chalazal portion, which at the smaller ends communicated through the hollow connective, as shown in the sectional view of Fig. 2. The sizes of the eggs were as follows:

Total length of the two, 113 mm.; length of large egg, 55 mm.; length of smaller, 52 mm.; length of connective, 16 mm.; short diameter of larger, 40 mm.; short diameter of smaller, 23 mm.; short diameter of connective, 8 mm.

Concerning the origin of these abnormal eggs the views expressed by Schumacher are quite similar in most respects to those expressed in my original report. There seems little doubt that they have been produced by an unusual retention

of the egg within the uterus and by its recession through the oviduct over the regions of the albumen and shell glands. This might be effected without serious difficulty by a strong antiperistaltic action of the oviduct, to use Schumacher's phrase.

As a motive for such retention I have suggested the probability of some unnatural conditions, such as fright, confinement, etc. In the case of the ostrich referred to, this would seem plausible, and in some of the cases coming under my own notice, where the fowls had been confined within coops, such might be a most likely cause. The unusually artificial conditions of the ostrich might operate as a more or less permanent obstacle to the egg-laying. That the egg in this case had been retained for a considerable time within the uterine duct must be evident, and if the several layers were of albuminous secretion they could only have been deposited by successively passing over these glands.

Concerning the egg in which development of the embryo had gone forward as indicated, a similar process must have obtained, as is evident both from the state of development attained, as well as the second deposit of albumen and shell. It may not be without plausibility that by some such process arose the ovoviviparous habit common in many egg-laying animals. If an egg may go forward in development for four or five days under such conditions, why might it not be gradually extended until chicks might be born instead of hatched?

Concerning the egg shown in Fig. 2, it is obvious that a different account must be given. The most obvious explanation would seem to be that two eggs had been discharged from the ovary within brief intervals, but not coincident, since we should then have the not unusual phenomenon of a double-yolk egg, yet so closely following each other that they became connected by the albuminous secretions which would thus be continuous. The first to descend would thus receive its full complement of albumen, while the second would be scantily supplied owing to the depleted condition of the glands following the first discharge. But it will be noticed that by this account we should have the first egg descending the oviduct broad end foremost,

while ordinarily the opposite is the case.¹ That there is no insuperable difficulty in the matter, however, and that such is not invariably the case, I think is evident. I have discovered during these observations several cases in which normal eggs have shown evidence of such reversed descent, having upon the small ends of the egg-shell a vermian-like coil of indurated shell substance, apparently produced as a sort of concluding deposit from the shell glands strung out upon the descending egg.

SYRACUSE UNIVERSITY, December, 1897.

Since the above was in type a similar case in some respects was submitted by Prof. F. H. Herrick before the Morphological Society, an abstract of which appeared in *Science* of March 10, 1899. The rather distinctive feature of this was that the small, or inner, egg was included within the yolk of the larger. This would seem quite unusual, so far as my own inquiries have gone, at any rate, and would hardly be open to a similar explanation.

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¹ Foster and Balfour, *Embryology*, p. 17.